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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,782	06/27/2003	Sabina J. Houle	884.860US1	6464
21186	7590	06/02/2006	EXAMINER	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402			WARREN, MATTHEW E	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 06/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	10/607,782	HOULE, SABINA J.	
	Examiner	Art Unit	
	Matthew E. Warren	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 3/21/06.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 27-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4, 6-12, 15-18 and 27-30 is/are rejected.
- 7) ☒ Claim(s) 2, 3, 5, 13 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the Amendment filed on March 21, 2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 6-12, and 15-18 are rejected under 35 U.S.C. 102(b) as being anticipated by DiGiacomo et al. (US 6,085,831).

In re claims 1, 10, 15, and 30, DiGiacomo et al. shows (figs. 1 and 2) a package comprising: a heat spreader (53) including a die side and a heat sink side (top), a container barrier (sidewalls of heat spreader) disposed on the heat spreader die side wherein the container barrier and the heat spreader form a recess upon the die side, a die (21) in contact with portions of the container barrier (55), a liquid heat transfer medium (65) disposed in the recess, and at least one of an input and an output device (23) coupled to the die. A first channel is formed through the container barrier, wherein the first channel (having plug 60) is adjacent the heat spreader die side (fig. 2). A first plug (60) is disposed in the first channel through the container barrier.

In re claims 6 and 7, DiGiacomo shows (figs. 1 and 2) that the container barrier is selected from solder and metal (53).

In re claim 8, DiGiacomo shows (figs. 1 and 2) that a liquid heat transfer medium (65) is formed in the recess.

In re claim 9, DiGiacomo discloses (col. 6, lines 8-21) that the liquid heat transfer medium is an organic composition.

In re claims 11 and 12, DiGiacomo shows (figs. 1 and 2) that the heat spreader is selected from one of a heat slug, a heat pipe, and an integrated heat spreader, and that the die side of the heat spreader includes a convoluted interface (radiating fins within the cavity) with the liquid heat-transfer medium.

In re claim 16, DiGiacomo shows (figs. 1 and 2) all of the elements of the claims except the second channel formed through the heat spreader. DiGiacomo already shows one channel and plug formed in the heat spreader, however, it would have been obvious to one of ordinary skill in the art to use three, four, etc., channels and plugs since it has been held that mere duplication of the essential working pads of a device

In re claims 17 and 18, DiGiacomo shows (figs. 1 and 2) that the die (21) is in contact with the liquid heat transfer medium (65) and a mounting substrate (20) is coupled to the die.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over DiGiacomo et al. (US 6,085,831) as applied to claim 1 above, and further and Studebaker (US 6,448,637 B1).

In re claim 4, DiGiacomo shows all of the elements of the claims except the plug being gas and liquid permeable. Studebaker shows (figs. 1 and 2) a hermetic package having a plug (30) formed in a channel to seal the package and prevent outside materials from entering the package but also allowing gas and moisture to be released if the internal pressure builds up. Such a configuration reduces mechanical stresses on the package (col. 2, lines 39-53). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the plug in the package of DiGiacomo by using gas and liquid permeable plugs as taught by Studebaker to reduce mechanical stress on the package while maintaining its protection from the outside environment.

Claims 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over DiGiacomo et al. (US 6,085,831) in view of Homer et al. (US Pub. 2002/0154483 A1).

In re claim 27, DiGiacomo et al. shows (figs. 1 and 2) a computing system comprising: a package comprising: a heat spreader (53) including a die side and a heat sink side (top), a container barrier (sidewalls of heat spreader) disposed on the heat spreader die side wherein the container barrier and the heat spreader form a recess upon the die side, a die (21) in contact with portions of the container barrier (55), a liquid heat transfer medium (65) disposed in the recess, and at least one of an input and an

output device (23) coupled to the die. A first channel is formed through the container barrier, wherein the first channel (having plug 60) is adjacent the heat spread die side (fig. 2). A first plug (60) is disposed in the first channel through the container barrier. DiGiacomo et al. shows all of the elements of the claims except the dynamic random access data storage coupled to the die. It is well known in the art that a DRAM can be coupled to a die liquid cooled die however, Homer et al. discloses that a cooled processor (0024) may be coupled to a DRAM (001 8) to store and facilitate the execution of programs. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the package of DiGiacomo et al. by coupling a DRAM to the die of the package as taught by Homer to store and facilitate the execution of programs.

In re claims 28 and 29, Homer discloses (0016) that the computing system is disposed in a computer and that the die is selected from a processor.

Allowable Subject Matter

Claims 2, 3, 5, 13, and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed with respect to claims 1-18 and 27-30 have been fully considered but they are not persuasive. The applicant argues that the cited references

do not show all of the elements of the claims, specifically that DiGiacomo does not show the heat sink side of the heat spreader and the channel adjacent the heat spreader die side. The examiner believes that the references show all of the elements of the claims. As stated in the rejection above, DiGiacomo shows a heat sink side of the enclosure, the heat sink side including the fins (58) and the die side including the portions (55) that form an interface with the semiconductor substrate top surface. Furthermore, the plug (60) is formed on the top surface of the heat sink chamber but because the channel that holds the plug is formed into the chamber of the heat sink, that first channel is adjacent the heat spreader die side (the channel faces the semiconductor die). Therefore, DiGiacomo shows all of the elements of the claims and the rejection is proper. This action is made final.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

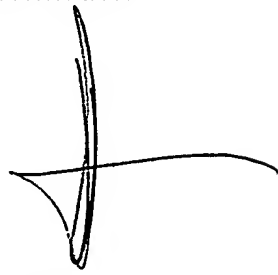
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Warren whose telephone number is (571) 272-1737. The examiner can normally be reached on Mon-Thur and alternating Fri 9:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MEW
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May 30, 2006


KENNETH PARKER
SUPERVISORY PATENT EXAMINER